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Relationship between adverse childhood experiences and unemployment among adults from five US states

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Abstract

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Purpose—Our study assesses the relationships between self-reported adverse childhood experiences (ACEs) (including sexual, physical, or verbal abuse, along with household dysfunction including parental separation or divorce, domestic violence, mental illness, substance abuse, or incarcerated household member) and unemployment status in five US states in 2009.

Methods—We examined these relationships using the 2009 Behavioral Risk Factor Surveillance System survey data from 17,469 respondents (aged 18–64 years) who resided in five states, completed the ACE Questionnaire, and provided socio-demographic and social support information. We also assessed the mediation of these relationships by respondents' educational attainment, marital status, and social support.

Results—About two-third of respondents reported having had at least one ACEs, while 15.1 % of men and 19.3 % of women reported having had ≥4 ACEs. Among both men and women, the unemployment rate in 2009 was significantly higher among those who reported having had any ACE than among those who reported no ACEs ($p < 0.05$). Educational attainment, marital status, and social support mediated the relationship between ACEs and unemployment, particularly among women.

Conclusions—ACEs appear to be associated with increased risk for unemployment among men and women. Further studies may be needed to better understand how education, marital status, and social support mediate the association between multiple ACEs and unemployment.

Keywords

Adverse childhood experiences; Unemployment; Mediation analysis; Social support

Introduction

Adverse childhood experiences (ACEs) include, but are not limited to, abuse, neglect, exposure to parental discord, witnessing domestic violence, and growing up with a substance abusing, mentally ill, or incarcerated household member. Results of previous studies have indicated that more than half of adult respondents in five states experienced at least one ACE category during childhood [1]. Furthermore, ACEs are highly interrelated events and differ by gender [1–3]. Recently, a great deal of evidence suggests that ACEs have been associated with chronic diseases, premature death [4–10], cigarette smoking, substance abuse, alcohol abuse [11–14], anxiety, and depression [15–21].

In addition to its association with a broad range of adverse health consequences, ACEs may also have a negative impact on victims' socio-economic well-being in adulthood. Evidence suggests that exposure to maltreatment and abuse in childhood is associated with lower educational attainment, more antisocial behaviors, more frequent absence from work, poor job performance, and disability retirement [22–26]. However, few studies have examined the relationship between multiple ACEs and unemployment in adulthood.

Results of an earlier prospective study suggested that there was a negative effect of child maltreatment in socioeconomic status including employment in adulthood, which appeared to have a greater impact among women than among men [27]. In addition, results of a retrospective study showed that adults who had experienced abuse or multiple types of

maltreatment in childhood had a higher risk of being unemployed than those who had none [28]. Both studies, however, were restricted to severe cases of child maltreatment.

To better understand the mechanism of long-term consequences of ACEs, prior research demonstrated that educational attainment and family support might mediate the relationship between violent victimization among youth aged 11–17 in 1976 and hourly earnings from a prospective survey with 10-year follow-up data (National Youth Survey), although the domain of violence victimization was broader than child maltreatment [29, 30]. Other studies also demonstrated that adults who reported being maltreated as a child were more likely to report marital disruption such as divorce and separation than those who reported no maltreatment [31, 32]. These findings suggested that the long-term impact of child maltreatment on socio-economic status in adulthood might be mediated by other social characteristics. More important, exploring potential mediating effects may help improve our understanding of the association between ACEs and employment and may also suggest interventions to ameliorate the potential adverse impact of ACEs on victims' socio-economic well-being in adulthood. In this study, we apply data from a large, state-based surveillance system to assess relationships between ACEs and unemployment among men and women aged 18–64 years to test the hypothesis that ACEs have a positive association with unemployment in adulthood. We will further examine if this relationship is mediated by educational attainment, marital status, and perceived frequency of social support.

Methods

Data source

We analyzed data from the Behavioral Risk Factor Surveillance System (BRFSS) survey. The BRFSS is a random-digital-dialed telephone survey conducted annually in all 50 states, the District of Columbia, and US territories to collect information concerning behaviors associated with risk for chronic diseases and other health conditions among non-institutionalized US civilians aged ≥18 years [33]. Data are collected by trained interviewers who administer standardized questionnaires to households selected through probability sampling. A detailed description of the BRFSS survey design, data collection, and the full-text of the survey questionnaires can be found at http://www.cdc.gov/brfss/technical_infodata/. All respondents consented to participate in the survey before interviewing and the survey procedure has been approved by the institutional review boards in the department of health of each state and by the Centers for Disease Control and Prevention (CDC).

The data used in our analysis were from five states (Arkansas, Louisiana, New Mexico, Tennessee, and Washington) that administered a supplemental ACE module to the core BRFSS survey. The median survey response rate from eligible households among the five states was 60.0 % [34]. Of 19,701 respondents aged 18–64 years, we excluded 2,232 who failed to answer at least one ACE question (6.0 %), refused to answer any of the ACE questions (3.8 %), or had missing information on other variables of interest (1.5 %), resulting in a total of 17,469 study subjects (88.7 %). Excluded respondents in comparison to those remaining in the study were significantly ($p < 0.05$) more likely to be aged 18–34 years (35.6 vs. 30.4 %, respectively), to be Hispanic (11.0 vs. 7.4 %, respectively), and to

have <12 years education (15.1 vs. 8.1 %, respectively), and were significantly ($p < 0.05$) less likely to be married (54.9 vs. 63.9 %, respectively) and to be employed (59.1 vs. 65.3 %, respectively). However, individual ACE and the number of ACE events or ACE score among excluded respondents who provided all or some ACE information did not differ significantly ($p > 0.05$) from those included in the study.

ACE categories

A total of 11 questions about ACEs were adopted from a validated longer set of ACE-related questions, which were tested in focus groups prior to being used in the BRFSS survey [2]. Respondents' answers to these 11 questions were used to determine whether they had experienced any of three categories of child abuse (sexual, physical, and verbal abuse) and any of five categories of household dysfunction before age 18 years (parental separation or divorce, domestic violence, or having lived with a household member who was mentally ill, a substance abuser, or incarcerated). The definitions of these categories and the corresponding prevalence among men and women are shown in Table 1. Specifically, an affirmative response to at least one question in the ACE category such as sexual abuse was defined as being positive for that ACE category. Those respondents who answered “don't know” or “not sure” to any one of the ACE questions (<0.5 %) were considered not to have had an ACE for that category. The ACE score (range 0–8), a count of the total number of ACEs respondents reported, was calculated to examine the cumulative effect of ACEs on unemployment. For some analyses, the upper limit of ACE score was arbitrarily categorized as ≥4 ACEs so as to increase the power of our analyses because of smaller sample size at higher levels.

Outcome variable

Respondents' employment status was based on their response to the question “Are you currently employed?” Responses included unemployed <1 year, unemployed ≥1 year, employed for wages, self-employed, homemakers, students, retired, and unable to work. For the purpose of this study, we defined unemployed respondents as only those persons unemployed <1 year or ≥1 year versus all other categories; the number of persons unemployed ≥1 year were too small for analyses of separate unemployment categories. We calculated unemployment rates by dividing the number of respondents who reported being unemployed by the number of the study population in subgroups defined by gender, ACEs, and other selected characteristics. As the percentage of respondents who reported being unemployed did not differ significantly by state, we combined data from all five states to increase the power of our analyses.

Covariates

Sociodemographic covariates were sex, age (18–34, 35–44, 45–54, 55–64 years) and race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, other non-Hispanic). Potential mediating covariates were educational attainment in years (<12, 12,>12), marital status [married, previously married (i.e., divorced, widowed, or separated), never married], and perceived frequency of receiving needed social support (always or usually, sometimes, rarely or never).

Statistical analyses

From descriptive analyses of the selected characteristics among the study sample, we demonstrated the relationship of four employment categories (employed, unemployed, unable to work, and other) with ACE score (0, 1, 2, 3, and ≥4 ACEs) for all respondents. Given the gender difference in ACEs reported from previous studies, we obtained gender-specific prevalence of individual ACEs and ACE score. Next, we assessed the gender-specific percentages of unemployment and of reporting ≥4 ACEs for groups defined by socio-demographic characteristics and social support. Separate gender-specific multivariate logistic regression models, which included age and race/ethnicity as covariates, were conducted to obtain adjusted odds ratios (AORs) and 95 % confidence intervals (CIs) for the likelihood of unemployment associated with each individual ACE and the ACE score. We also examined interactions between ACE score and education, ACE score and marital status, and ACE score and perceived social support on unemployment in three separate models. No significant interaction term was identified in our analysis ($p \geq 0.10$). Finally, a modified gender-specific Sobel test was performed in separate multivariate logistic regression models to assess the effect of each of the three potential mediators on the relationship between ACEs and unemployment [35, 36]. The percent of the total effect that was mediated was calculated using a previously described procedure [35]. We considered a mediating effect to be significant only if the ACE in question was significantly associated with both the mediator and unemployment, and the mediator was significantly associated with unemployment [37]. Furthermore, a partial mediating effect was determined if the relationship between ACEs and unemployment still remained significant when the potential mediator was added to the model. There was a complete mediating effect if the relationship between ACEs and unemployment was no longer significant with the mediator in the model. To account for the complex sampling design of the BRFSS survey, we used SAS-callable SUDAAN [38] for all analyses.

Results

Characteristics of the study population

Table 1 shows the percentage of each ACE by gender. More than a quarter of men and women reported having a childhood history of verbal abuse, parental separation or divorce, or living with a substance abuse household member before age 18. Women were significantly ($p < 0.05$) more likely than men to report sexual abuse (18.7 vs. 6.5 %), verbal abuse (30.1 vs. 26.9 %), living with a substance abuse member (33.4 vs. 29.6 %), or living with a mentally ill household member (24.9 vs. 18.4 %) during childhood. Women were significantly ($p < 0.05$) more likely than men to report having at least one ACE (64.9 vs. 60.5 %).

The data in Table 2 show similar distributions in age, race/ethnicity, educational attainment, and social support between men and women. However, more men reported being never married (20.8 vs. 16.5 %), being unemployed <1 year (6.5 vs. 4.3 %), and being employed/self-employed (72.5 vs. 58.4 %) than did women ($p < 0.05$). In contrast, more women reported being previously married (20.4 vs. 14.5 %, $p < 0.05$). Overall, 9.5 % of men and 7.4 % of women in this study population reported being unemployed in 2009, regardless of

length of unemployment ($p < 0.05$). In addition, there was no gender difference in being unemployed ≥1 year.

Association of ACEs and ACE score with unemployment

Figure 1 illustrates the relationship of employment with ACE score. As ACE score increased, the proportion of employed respondents declined while the proportion of unemployed or those who reported being unable to work increased. For example, the proportion who reported being unemployed was 5.8 % among those with no ACEs compared to 13.2 % among those with ≥4 ACEs ($p < 0.001$).

Among men, all categories of ACEs except living with a mentally ill household member were associated with unemployment after controlling for age and race/ethnicity ($p < 0.05$, Fig. 2a). Men who had ACEs were almost twice as likely to report being unemployed as men had none. Among women, individual ACE that were significantly associated with unemployment included child abuse, parental separation/divorce or living with an incarcerated household member ($p < 0.05$). However, witnessing domestic violence and living with a substance abuse or a mentally ill member were not significantly associated with unemployment among women (Fig. 2b). In addition, a significant relationship between multiple ACEs and unemployment was observed among both men and women even after adjustment for age and race/ethnicity (Fig. 3). Specifically, among men, those who had 1 ACE, 2 ACEs, and 3 ACEs were about two times more likely to report being unemployed than those who had none; those who had ≥4 ACEs were 3.6 times more likely to report unemployment than those who had none (Fig. 3, $p < 0.001$). Among women, compared to those who had no ACEs, those who had 1 ACE, 2 ACEs, and 3 ACEs were equally likely to report unemployment; however, those who had ≥4 ACEs were 1.6 times more likely to report unemployment ($p < 0.001$).

Association of covariates with unemployment and with ≥4 ACEs

Gender-specific percentages of unemployment among selected socio-demographic characteristics are demonstrated in Table 3. In 2009, the percentages of unemployment were significantly higher among respondents aged 18–34 years than among those aged 55–64 years ($p < 0.001$), but unemployment did not differ significantly by race/ethnicity regardless of gender (Table 3).

Table 3 also shows the percentages of reporting ≥4 ACEs by selected characteristics. Women were significantly more likely to report ≥4 ACEs ($p < 0.05$). Among both men and women, the prevalence of ≥4 ACEs declined with increasing levels of age. Among men, the prevalence of having ≥4 ACEs did not differ significantly by race/ ethnicity. In contrast, among women, non-Hispanic blacks reported a much lower prevalence of having ≥4 ACEs than did women in any other racial/ethnic group ($p < 0.05$).

Mediating analysis

Association of mediators with ≥4 ACEs and with unemployment—Among both men and women, the prevalence of ≥4 ACEs declined with increasing levels of educational attainment and was higher among those reporting rarely or never having social support

compared to those reporting always or usually having social support (Table 3). Among men, the prevalence of having ≥4 ACEs did not differ significantly by marital status. In contrast, among women, those who were previously married or never married reported a much higher prevalence than did married women ($p < 0.05$).

There was a significant inverse relationship between educational attainment and unemployment among men and women ($p < 0.05$, Table 3). Married respondents had a significantly lower unemployment rate than those in other marital categories, and respondents who reported always or usually having social support when needed had a significantly lower unemployment rate than those in other social support categories ($p < 0.05$).

Mediation effects

A significant partial mediating effect of educational attainment was observed among men on the relationships of unemployment with experiencing parental separation or divorce (mediation effect = 18.5 %), witnessing domestic violence (10.3 %), living with a substance abuser (12.1 %), and an incarcerated household member (20.6 %) ($p < 0.05$, Table 4, Model 2). A similar partial mediating effect of educational attainment was also demonstrated among women in the relationships of unemployment with physical abuse (12.9 %) and having ≥4 ACEs (10.2 %) ($p < 0.01$). However, the significant relationships of unemployment with experiencing parental separation or divorce (14.9 %) and living with an incarcerated household member (29.6 %) were completely attenuated by educational attainment among women ($p > 0.05$).

The data in Table 4 also indicated that marital status was a partial mediator in the relationships of unemployment with sexual abuse among men (mediation effect = 13.3 %) and women (22.5 %), and with physical abuse (23.2 %) and having ≥4 ACEs (37.5 %) among women ($p < 0.05$, Model 3). A complete mediation effect of marital status on the relationships of unemployment with verbal abuse (25.2 %), experiencing parental separation or divorce during childhood (21.7 %), and living with an incarcerated member (26.2 %) was observed among women ($p > 0.05$).

Furthermore, social support was a partial mediator in the relationships of unemployment with physical abuse, verbal abuse, witnessing domestic violence, living with a mentally ill, substance abuse, or an incarcerated household member, and reporting to have three ACEs among men ($p < 0.05$, Table 4, Model 4). Among women, social support was a partial mediator in the relationships of unemployment with physical abuse and having ≥4 ACEs ($p < 0.05$), and a complete mediator with sexual abuse, verbal abuse, experiencing parental separation or divorce, and living with an incarcerated household member ($p > 0.05$, Model 4).

Discussion

Our results showed that reported childhood experiences of abuse and household dysfunction were associated with an increased risk for unemployment among both men and women. Therefore, the economic cost including income loss over the life span for victims could be

substantial. For example, prior data indicated that the estimated direct and indirect cost could be more than 57 billion US dollars based on approximately 3.3 million maltreated or neglected children reported to US state and local child protective services in 2008 [39].

One of the distinctions in this study from the previous research is that we explore a pathway that household dysfunction in childhood as well as child abuse could have a long-term impact on employment in adulthood through education, marital status, and social support, which differs by sex, among a population sample aged 18–64 years from five states in 2009. As previously noted, most prior studies of this relationship have been limited by their reliance on relatively small samples and lack of a control group [40, 41]. In addition, a few studies showed markedly greater risk for unemployment among adults who had had adverse childhood experiences as our results did. However, these studies were restricted to severe cases of child maltreatment [27, 28, 42].

One possible explanation for the relationship between ACEs and unemployment is that ACEs impair children's cognitive ability, resulting in lower educational attainment and social isolation [23, 25], which in turn lead to a reduced likelihood of employment. Furthermore, ACEs tend to make the victims less resilient to adversity. A study of childhood maltreatment suggests that in addition to individual characteristics (e.g., gender, IQ, and personality), exposure to multiple social stressors (e.g., crime, substance use, and antisocial behavior), which are similar to household dysfunction, reduces the resilience of maltreated children [43], although that study did not look at the lasting effects of maltreatment into adulthood. In addition, prior study results have shown that social relationships and social support may affect health by mediating the adverse effects of stressors such as negative life events and traumas [44–46].

Our data indicated that women reported higher percentages of having lived with a substance abuser or mentally ill household member than did men. This finding may reflect women's greater comfort with revealing family problems although further study is needed to assess the hypothesis. In addition, that women were shown to be more likely to report sexual abuse than men, but equally likely to report the rest of five ACEs, were consistent with the results from previous study [2].

The other noteworthy observation in this study is that there was a negative relationship between successive age groups and having ≥4 ACEs, which was similar to findings from a retrospective cross-sectional study of ACEs and adult mental health [47]. This pattern might imply a genuine cohort effect or might be due to recall bias among the elderly [2, 47].

Furthermore, our data also support that the association between ACEs and unemployment is not additive because there was a similar effect of having 1 ACE, 2 ACEs, and 3 ACEs on unemployment among men compared to men with 0 ACE and there was no difference in unemployment rates among women who had 0, 1, 2, and 3 ACEs. Similar results were also demonstrated in a recent study with psychological disorders as the research outcomes [47, 48]. Thus, further study is needed to better understand the clustering effects of ACEs [47–49].

Among women, the mediating effect of educational attainment, marital status, and social support actually eliminated the associations of unemployment with parental separation/divorce or living with a mentally ill member. Therefore, efforts to increase educational levels and improve social support among women who have had these experiences may help reduce the risk for being unemployed.

In addition, the mediating effect of marital status on the relationship between ACEs and unemployment may reflect an increased risk for social isolation and stress among unmarried women with a history of ACEs [50–52], further suggesting a need for programs that target single mothers with a history of ACEs [53]. It is not clear why marital status attenuated the relationships of ACEs (except for sexual abuse) with unemployment more differently among women than that among men. These relationships may indicate the complexity of marriage classification and sex contingencies in the effects of the ACEs on employment [54, 55]. The partial mediation of marital status in the relationship between sexual abuse and unemployment among men and women was consistent with the results from a previous study [31].

The reason is also unclear for our finding that the association between some ACEs and unemployment is completely eliminated by mediators among women, but only attenuated among men. Previous evidence suggests that gender roles may contribute to differences between men and women in how ACEs affect their physical and psychological well-being [54, 55]. For example, rates of cognitive impairment, shame, and other mental distress associated with ACEs have been found to be higher among male victims than among female victims [56, 57]. Furthermore, men may be more likely than women to under-report some categories of ACEs such as sexual abuse because of shame and distress [57].

Our study had at least four limitations. First, our reliance on cross-sectional data prevented us from making any causal inference. Prospective studies will be needed to corroborate our results concerning the effects of mediating factors on the relationship between ACEs and unemployment. Second, those respondents excluded from the present study due to missing data may influence our results. In addition to those missing data, non-response as well as the reliance on self-reported ACEs, socio-economic variables, and employment status may also bias our conclusions and bias the results toward the null. The results of previous studies have shown that some childhood socio-economic status (SES) such as limited parental education, lower household income, and unemployment, single parent, lack of social support, and changing residences frequently have been significantly associated with child abuse and unemployment [27, 58, 59]. However, we were unable to adjust for these potential confounders because these data were not collected in the BRFSS survey. Thus, studies are needed to further clarify the relationships of parental SES with ACEs and respondents'SES in adulthood. Furthermore, even though unemployment rates in the five states in our study were relatively similar (ranging from 6.8 % in Arkansas to 9.5 % in Tennessee), we did not have information on how states may differ structurally with regard to unemployment such as occupational class, nor did we have individual data on reasons for unemployment. Finally, the generalizability of our findings to the overall US population is limited as our data were collected in only five states and people who did not have a landline phone and lived in some institutions were also excluded from the BRFSS survey.

Conclusions

Our findings reinforce evidence from previous studies that ACEs are common and associated with adverse consequences during adulthood such as poor education, lack of needed social support, and unemployment that also affect the families of people dealing with these events. Our findings suggest a need for more interventions to promote the intellectual and social capability of abused children and hopefully, improve their socioeconomic well-being in adulthood.

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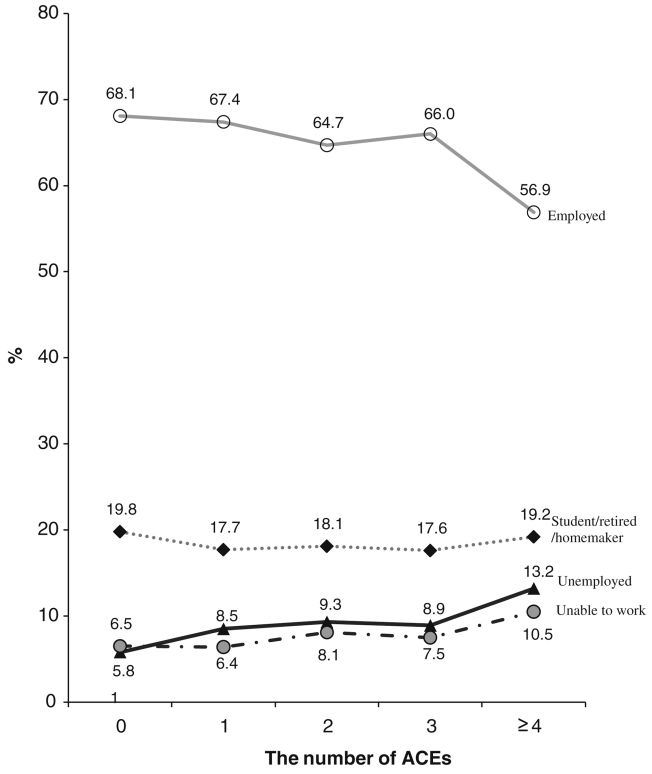

Fig. 1. The distribution of employment categories by ACE score among respondents aged 18–64 years, 2009 BRFSS data from Arkansas, Louisiana, New Mexico, Tennessee, and Washington

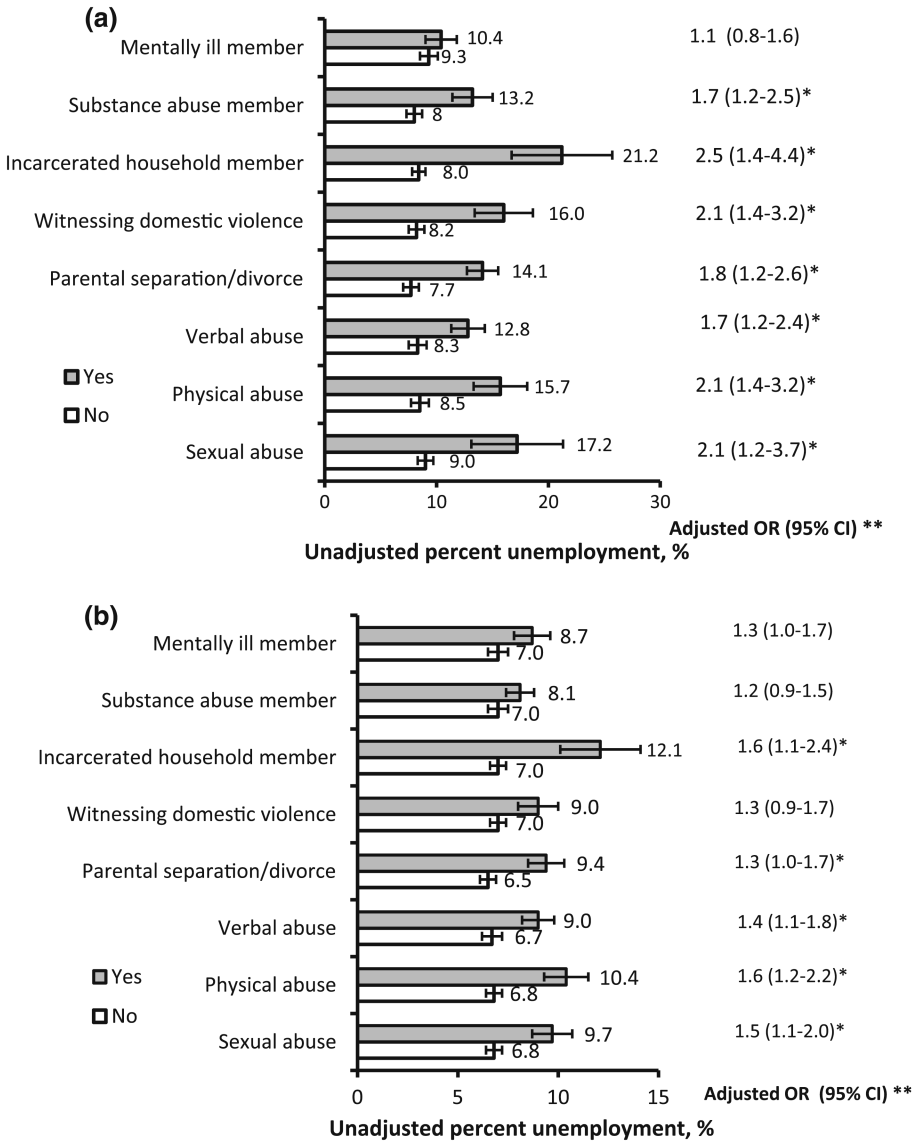

Fig. 2.

Unemployment rates by self-reported history of ACEs among men (**a**) and women (**b**) aged 18–64 years, 2009 BRFSS data from Arkansas, Louisiana, New Mexico, Tennessee, and Washington. *$p < 0.05$. **Odds ratio (OR) and 95 % confidence interval (CI) obtained from multivariate logistic regression analysis with adjustments for age and race/ ethnicity

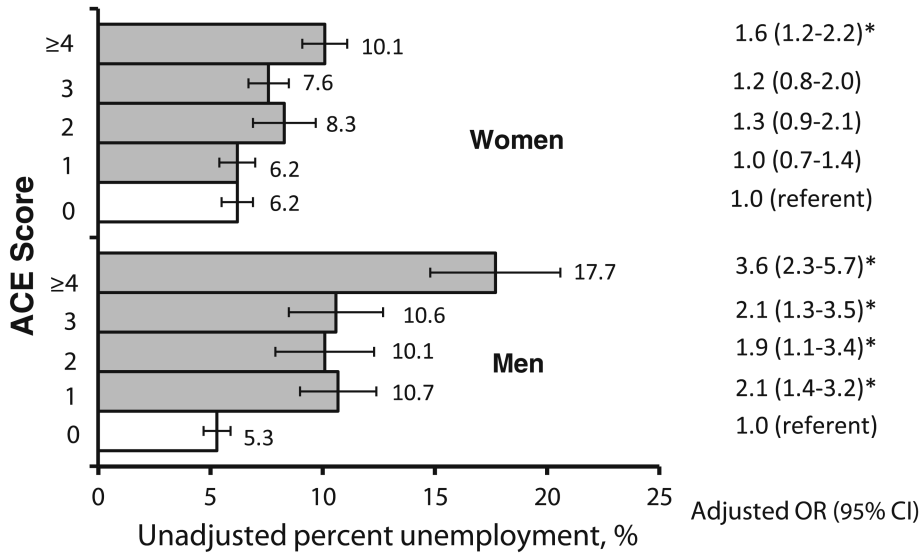

Fig. 3.

Unemployment rates by ACE score and odds ratios for unemployment risk by ACE score among men and women aged 18–64 years, 2009 BRFSS data from Arkansas, Louisiana, New Mexico, Tennessee, and Washington. *$p < 0.05$. **Odds ratio (OR) and 95 % confidence interval (CI) obtained from multivariate logistic regression analysis with adjustments for age and race/ethnicity

Table 1

Definition and prevalence of self-reported each of eight categories of adverse childhood experiences (ACEs) and distribution of number of ACEs among respondents aged 18–64 years, by sex

ACE category	Men (*N* = 6,393)		Women (*N* = 11,076)	
	N	% (95 % CI)	*N*	% (95 % CI)
Sexual abuse[a]				
(How often did anyone at least 5 years older than you, or an adult…)	470	6.5 (5.5–7.5)	2,096	18.7 (17.5–19.9)
1. Once or more than once ever touch you sexually?				
2. Once or more than once ever try to make you touch them sexually?				
3. Once or more than once force you to have sex?				
Physical abuse[a]				
(How often did a parent or adult in your home…)	994	14.8 (13.3–16.3)	1,848	16.7 (15.6–17.8)
Once or more than once ever hit, beat, kick, or physically hurt you in any way? Do not include spanking				
Verbal abuse[b]				
(How often did a parent or adult in your home…)	1,832	26.9 (25.1–28.7)	3,290	30.1 (28.7–31.5)
More than once ever swear at you, insult you, or put you down?				
Parental separation or divorce[c]				
(Were your parents…)	1,559	29.1 (27.0–31.3)	2,914	29.9 (28.5–31.3)
Separated or divorced?				
Witnessed domestic violence[a]				
(How often did your parents or adults in your home…)	1,078	16.7 (15.1–18.3)	2,054	18.6 (17.4–19.8)
Once or more than once ever slap, hit, kick, punch, or beat each other up?				
Incarcerated household member[a]				
(Did you live with anyone who…)	399	8.5 (7.0–10.0)	679	7.8 (6.9–8.7)
Served time or was sentenced to serve time in a prison, jail, or other correctional facility?				
Substance abuse household member[a]				
(Did you live with anyone who…)	1,855	29.6 (27.5–31.7)	3,620	33.4 (32.0–34.8)
1. Was a problem drinker or alcoholic?				
2. Used illegal street drugs or who abused prescription medications?				
Mentally ill household member[a]				
(Did you live with anyone who was…)	1,056	18.4 (16.6–20.1)	2,594	24.9 (23.5–26.2)
Depressed, mentally ill, or suicidal?				
Number of ACEs				
0	2,542	39.5 (37.3–41.6)	3,979	35.1 (33.6–36.5)
1	1,540	23.0 (21.3–24.8)	2,432	21.5 (20.3–22.7)
2	878	14.2 (12.6–15.7)	1,521	13.5 (12.5–14.5)
3	575	8.2 (7.2–9.3)	1,145	10.6 (9.6–11.5)
4	394	7.3 (5.9–8.7)	800	7.3 (6.5–8.1)

ACE category	Men (*N* = 6,393)		Women (*N* = 11,076)	
	N	% (95 % CI)	*N*	% (95 % CI)
5	233	3.4 (2.6–4.1)	564	5.5 (4.8–6.2)
6	153	3.1 (2.2–4.0)	345	3.6 (3.0–4.2)
7	61	1.0 (0.7–1.4)	224	2.2 (1.7–2.6)
8	17	0.3 (0.1–0.5)	66	0.8 (0.5–1.1)

2009 Behavioral Risk Factor Surveillance System data from Arkansas, Louisiana, New Mexico, Tennessee, and Washington

[a] A “no” response includes “no or never,” or “don't know or not sure.”

[b] A “no” response includes “no or never,” “once”, or “don't know or not sure.”

[c] A “no” response includes “never,” “don't know or not sure,” or “parents not married.”

Table 2

Distribution of selected characteristics among respondents aged 18–64 years, by sex

Characteristics	Men (*N* = 6,393)		Women (*N* = 11,076)	
	n	**% (95 % CI)**	***n***	**% (95 % CI)**
Age (years)				
18–34	1,013	31.0 (28.8–33.2)	1,804	29.9 (28.4–31.4)
35–44	1,197	28.2 (26.0–30.3)	2,149	27.9 (26.4–29.4)
45–54	1,933	22.9 (21.4–24.5)	3,352	23.8 (22.6–24.9)
55–64	2,250	17.9 (16.7–19.1)	3,771	18.5 (17.6–19.3)
Race/ethnicity				
Non-Hispanic white	4,775	76.2 (74.4–78.0)	7,953	74.3 (73.0–75.6)
Non-Hispanic black	578	10.5 (9.1–11.9)	1,410	12.7 (11.6–13.7)
Hispanic	611	7.1 (6.1–8.0)	1,083	7.7 (7.0–8.4)
Others	429	6.2 (5.3–7.2)	630	5.4 (4.6–6.1)
Education level (years)				
<12	513	8.4 (7.0–9.8)	835	7.7 (6.8–8.6)
12	1,756	28.4 (26.4–30.5)	2,893	26.3 (24.9–27.6)
>12	4,124	63.2 (61.0–65.4)	7,348	66.0 (64.6–67.5)
Marital status				
Married	4,008	64.7 (62.6–66.8)	6,393	63.1 (61.6–64.5)
Divorced, widowed, separated	1,348	14.5 (13.1–15.9)	3,183	20.4 (19.3–21.6)
Never married	1,037	20.8 (18.9–22.7)	1,500	16.5 (15.3–17.7)
Frequency of social support				
Rarely/never	604	8.4 (7.3–9.6)	864	7.1 (6.3–7.9)
Sometimes	834	12.2 (10.6–13.7)	1,443	12.0 (10.9–13.0)
Always/usually	4,955	79.4 (77.6–81.2)	8,769	81.0 (79.7–82.2)
Employment status				
Unemployed<1 year	335	6.5 (5.2–7.9)	387	4.3 (3.6–4.9)
Unemployed ≥1 year	161	3.0 (2.2–3.8)	293	3.1 (2.5–3.7)
Employed/self-employed	4,508	72.5 (70.4–74.5)	6,611	58.4 (56.9–59.9)
Student/retired/homemaker	787	10.5 (9.3–11.8)	2,737	26.7 (25.3–28.1)
Unable to work	602	7.5 (6.3–8.6)	1,048	7.5 (6.8–8.2)

2009 Behavioral Risk Factor Surveillance System data from Arkansas, Louisiana, New Mexico, Tennessee, and Washington

Table 3

Sex-specific prevalence of unemployment and reporting ≥4 adverse childhood experiences among respondents aged 18–64 years, by selected characteristic

	Unemployment[a]		≥4 ACEs	
	Men (*N* = 6,393) % (95 % CI)	Women (*N* = 11,076) % (95 % CI)	Men (*N* = 6,393) % (95 % CI)	Women (*N* = 11,076) (95 % CI)
Total	9.5 (8.0–11.0)	7.4 (6.5–8.2)	15.1 (13.4–16.9)	19.3 (18.1–20.6)
Age (years)				
18–34	12.6 (9.1–16.2)	9.7 (7.8–11.6)	19.1 (15.3–22.8)	26.1 (23.2–29.0)
35–44	9.3 (6.1–12.4)	7.4 (5.5–9.3)	16.8 (12.7–20.9)	17.8 (15.5–20.1)
45–54	8.1 (6.3–10.0)	6.0 (4.8–7.3)	11.6 (9.6–13.6)	17.4 (15.5–19.3)
55–64	6.3 (5.0–7.6)	5.3 (4.2–6.4)	10.2 (8.1–12.4)	13.3 (11.7–14.8)
Race/ethnicity				
Non-Hispanic white	8.6 (6.9–10.3)	6.6 (5.6–7.5)	14.6 (12.6–16.7)	19.9 (18.5–21.4)
Non-Hispanic black	16.3 (9.8–22.8)	9.4 (7.0–11.9)	16.9 (10.4–23.5)	12.1 (9.0–15.1)
Hispanic	10.2 (6.8–13.5)	8.5 (5.9–11.1)	17.4 (13.0–21.8)	20.5 (16.6–24.3)
Others	8.9 (5.1–12.7)	12.5 (7.5–17.5)	15.3 (10.4–20.3)	26.9 (20.9–32.9)
Education level (years)				
<12	13.2 (6.5–20.0)	16.5 (11.4–21.5)	29.1 (18.8–39.5)	30.4 (24.6–36.3)
12	14.8 (10.9–18.7)	10.2 (8.1–12.4)	15.6 (12.4–18.8)	18.2 (15.9–20.6)
>12	6.7 (5.4–7.9)	5.2 (4.4–5.9)	13.1 (11.2–14.9)	18.5 (17.1–19.9)
Marital status				
Married	6.3 (4.7–7.9)	4.8 (4.0–5.7)	13.8 (11.6–16.1)	16.5 (15.0–17.9)
Divorced, widowed, separated	13.4 (9.9–16.9)	10.0 (7.9–12.0)	17.6 (14.2–21.1)	25.3 (22.8–27.9)
Never married	16.8 (12.4–21.3)	14.0 (11.0–16.9)	17.4 (13.3–21.5)	22.9 (19.3–26.6)
Frequency of social support				
Rarely/never	14.3 (9.3–19.2)	13.9 (9.7–18.1)	23.0 (17.6–28.3)	29.9 (24.8–35.0)
Sometimes	16.8 (10.4–23.2)	11.1 (7.9–14.3)	20.6 (15.0–26.2)	30.7 (26.4–35.0)
Always/usually	7.9 (6.4–9.4)	6.3 (5.4–7.1)	13.5 (11.5–15.4)	16.7 (15.5–18.0)

2009 Behavioral Risk Factor Surveillance System data from Arkansas, Louisiana, New Mexico, Tennessee, and Washington

[a]Unemployment includes unemployed <1 or ≥1 year

Table 4

Adjusted odds ratios for the relationship between adverse childhood experiences and unemployment and indirect effect of selected mediators among respondents aged 18–64 years, by sex

ACE category	Model 1[a] OR (95 % CI)	Model 2[b] OR (95 % CI)	Mediation by education (%)	Model 3[c] OR (95 % CI)	Mediation by marital status (%)	Model 4[d] OR (95 % CI)	Mediation by social support (%)
Men (*N* = 6,393)							
abuse	2.13 (1.22–3.70)	2.13 (1.24–3.66)*	–	1.96 (1.12–3.44)*	13.3*	2.08 (1.14–3.78)*	–
Physical abuse	2.07 (1.37–3.15)	2.07 (1.39–3.09)*	–	2.11 (1.36–3.26)*	–	1.89 (1.25–2.85)*	14.5*
Verbal abuse	1.69 (1.19–2.40)	1.78 (1.28–2.48)*	–	1.69 (1.19–2.42)*	–	1.58 (1.11–2.24)*	14.7*
Parental separation/divorce	1.77 (1.20–2.60)	1.62 (1.12–2.34)*	18.5*	1.75 (1.18–2.59)*	–	1.71 (1.16–2.50)*	8.0*
Witnessed domestic violence	2.08 (1.36–3.19)	1.96 (1.28–3.01)*	10.3*	2.11 (1.36–3.27)*	–	1.99 (1.29–3.06)*	7.4*
Incarcerated household member	2.45 (1.37–4.37)	2.14 (1.21–3.79)*	20.6*	2.46 (1.35–4.51)*	–	2.28 (1.28–4.06)*	9.5*
Substance abuse household member	1.72 (1.19–2.50)	1.65 (1.14–2.37)*	12.1*	1.75 (1.20–2.55)*	–	1.67 (1.15–2.45)*	7.9*
Mentally ill household member	1.12 (0.77–1.63)	1.14 (0.77–1.69)	–	1.11 (0.76–1.62)	–	1.09 (0.74–1.59)	–
Number of ACEs (vs. none)							
1	2.07 (1.35–3.18)	2.03 (1.33–3.10)*	–	2.06 (1.34–3.16)*	–	2.01 (1.32–3.07)*	–
2	1.92 (1.09–3.41)	1.87 (1.06–3.30)*	–	1.90 (1.06–3.40)*	–	1.85 (1.03–3.34)*	–
3	2.12 (1.28–3.52)	2.08 (1.26–3.42)*	–	2.11 (1.28–3.47)*	–	2.04 (1.25–3.31)*	12.6*
≥4	3.61 (2.29–5.68)	3.45 (2.20–5.40)*	3.0	3.55 (2.22–5.69)*	–	3.34 (2.09–5.32)*	4.9
Women (*N* = 11,076)							
Sexual abuse	1.49 (1.12–1.99)	1.43 (1.06–1.91)*	–	1.40 (1.06–1.86)*	22.5*	1.34 (1.00–1.79)	25.4*
Physical abuse	1.60 (1.19–2.15)	1.48 (1.09–2.00) *	12.9*	1.47 (1.10–1.96)*	23.2*	1.42 (1.06–1.91)*	24.7*
Verbal abuse	1.39 (1.07-–1.80)	1.37 (1.05–1.79)*	–	1.30 (1.00–1.69)	25.2*	1.28 (0.99–1.66)	26.0*
Parental separation/divorce	1.33 (1.02–1.73)	1.24 (0.96–1.61)	14.9*	1.27 (0.98–1.65)	21.7*	1.27 (0.97–1.65)	16.5*
Witnessed domestic violence	1.25 (0.93–1.68)	1.17 (0.87–1.57)	–	1.21 (0.91–1.62)	–	1.15 (0.85–1.55)	–
Incarcerated household member	1.62 (1.09–2.40)	1.36 (0.92–2.03)	29.6*	1.43 (0.97–2.11)	26.2*	1.47 (0.99–2.17)	21.5*
Substance abuse household member	1.16 (0.90–1.50)	1.10 (0.85–1.43)	–	1.12 (0.86–1.45)	–	1.08 (0.83–1.39)	–
Mentally ill household member	1.27 (0.96–1.69)	1.27 (0.96–1.68)	–	1.21 (0.91–1.62)	–	1.20 (0.90–1.60)	–
Number of ACEs (vs. none)							

ACE category	Model 1[a] OR (95 % CI)	Model 2[b] OR (95 % CI)	Mediation by education (%)	Model 3[c] OR (95 % CI)	Mediation by marital status (%)	Model 4[d] OR (95 % CI)	Mediation by social support (%)
1	0.96 (0.67–1.37)	0.95 (0.67–1.36)	–	0.93 (0.65–1.32)	–	0.95 (0.66–1.35)	–
2	1.34 (0.87–2.05)	1.31 (0.87–1.99)	–	1.30 (0.84–2.01)	–	1.29 (0.83–1.99)	–
3	1.24 (0.77–1.99)	1.24 (0.77–1.99)	–	1.18 (0.75–1.86)	–	1.11 (0.69–1.80)	–
≥4	1.60 (1.16–2.22)	1.48 (1.06–2.06)	10.2*	1.44 (1.04–1.99)	29.3*	1.41 (1.02–1.96)	37.5*

2009 Behavioral Risk Factor Surveillance System data from Arkansas, Louisiana, New Mexico, Tennessee, and Washington. Unemployment includes unemployed <1 or ≥1 year; '–' indicates that criteria for mediation have not been met

OR odds ratio, *CI* confidence interval

[a] Model 1 adjusted for age and race/ethnicity

[b] Model 2 adjusted for model 1 factors plus educational attainment

[c] Model 3 adjusted for model 1 factors plus marital status

[d] Model 4 adjusted for model 1 factors plus social support

* $p < 0.05$